

This text gives a brief but excellent account of the methods of mathematical physics. Despite the fact that this monograph is concerned primarily with the applications of the operational calculus to geophysics, one interested in a bird's-eye view of certain classical phases of mathematical physics can find them put down in short order. Many unusual problems of theoretical physics with geophysical applications are to be found.

A. E. HEINS

Matrix and Tensor Algebra for Engineers and Chemists. By Clarence E. Rose. Brooklyn, Chemical Publishing Co., 1940. 8+143 pp. \$4.00.

Matrix and Tensor Algebra has been written "for electrical and communication engineers and chemists who wish to learn about determinants, vectors and tensors." Its only mathematical interest lies in the complete novelty of its point of view.

For example, no need is felt for proofs; theorems are stated as *obiter dicta*. Such definitions as "a matrix is a group of independent but related quantities," "a determinant is a finite, imaginary, or complex quantity, or generalization of the algebraic number zero" illustrate its unorthodoxy further. However, as the book was not designed for mathematicians, it would be out of place to go into more detail.

GARRETT BIRKHOFF

Compendio di Meccanica Razionale. 2d revised edition. By Tullio Levi-Civita and Ugo Amaldi. Bologna, Zanichelli, 1938. 12+423+8+310 pp.

The two thousand page work by the same authors, entitled *Lezioni di Meccanica Razionale*, has already been adequately reviewed by K. P. Williams (this Bulletin, vol. 36, p. 781). It is one of the great standard works on mechanics of almost an encyclopaedic nature.

The *Compendio*, the work now under review, represents an attempt to cut down the *Lezioni* to the usual academic course of study in Italian universities and technical schools. This has been done by wholesale omissions of entire subjects rather than by abridged exposition. On the contrary, the emphasis on the foundations of the subject has been strengthened by a certain amount of additional material. Also included are a few minor corrections and revisions. For the most part, however, whole sections of the *Compendio* read word for word exactly as do the corresponding sections in the *Lezioni*.

Some of the subjects omitted in the *Compendio* are rather sur-

prising. We find, for example, no mention of the principle of least action, of Hamilton's canonical equations, or a fortiori of the Hamilton-Jacobi partial differential equation, or of invariant integrals. Thus there is necessarily no account of much of the important progress made during the last fifty years on the nature of conservative holonomic dynamical systems.

The length of the *Compendio* is further reduced by the omission of all exercises; for these the authors recommend the use of a book by Bisconcini (*Esercizi e Complementi di Meccanica Razionale*).

With all these omissions the work still runs to over seven hundred pages and thus still partakes something of an encyclopaedic nature in the more elementary parts of the subject. The balance between the statics and kinematics of the first part and the dynamics of the second part is, in our opinion, unfortunate. We should prefer a smaller first part and a larger second, especially inasmuch as the second part also contains a small amount of hydrodynamics and elasticity theory. For this reason we doubt the feasibility of using this work as a textbook in an American university, even if it were translated into English. But as a clearly and charmingly written reference book it might well prove invaluable.

D. C. LEWIS

Barlow's Tables of Squares, Cubes, Square Roots, Cube Roots and Reciprocals of all Integer Numbers up to 12,500. Edited by L. J. Comrie. 4th edition. London, Spon; Brooklyn, Chemical Publishing Co., 1941. 12+258 pp. \$3.00.

The book is accurately described by its title. Roots are given to six places of decimals, and reciprocals to seven significant figures. The directions given for interpolation and for computing additional figures are adapted to the use of computing machines. There is appended a short table of powers of integers from 1 to 100 up to the tenth, and of those from 1 to 10 up to the twentieth.

Barlow's Tables are of historical interest. First prepared and published in 1814 by Peter Barlow of the Royal Military Academy (Woolwich), they were edited and reissued by A. De Morgan in 1839. The plates ultimately wore out and a third edition was prepared in 1930 by Dr. Comrie of H. M. Nautical Almanac Office. The present is a revision of the third edition, in which the extension from 10,000 to 12,500 is new. The prefaces to the first three editions are included in the present text.

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